CLAIMS

What is claimed is:

1. A fuse structure for a semiconductor device on a substrate, the fuse structure comprising:

a fuse including:

an electrically conductive fuse line of a standard fuse length formed in an electrically conductive layer disposed over the substrate; and

a pair of electrically conductive, inwardly bent interconnects formed in a first plurality of electrically conductive layers disposed over the substrate, below the electrically conductive layer in which the fuse line is formed, the interconnects for coupling the fuse line to a circuit area of the substrate disposed under the fuse line.

2. The fuse structure according to claim 1, further comprising a protective guard ring formed around the fuse, the guard ring including a second plurality of electrically conductive interconnects.

3. The fuse structure according to claim 2, wherein portions of the interconnects forming end walls of the guard ring are bent inwardly in a manner that follows the interconnects of the fuse.

4. The fuse structure according to claim 2, further comprising a fuse window disposed above the fuse.

5. The fuse structure according to claim 4, wherein the fuse window is defined in a dielectric layer disposed over the substrate.

6. The fuse structure according to claim 1, further comprising a fuse window disposed above the fuse.

7. The fuse structure according to claim 6, wherein the fuse window is defined in a dielectric layer disposed over the substrate.

8. The fuse structure according to claim 2, further comprising a plurality of dielectric layers disposed over the substrate, the interconnects of the fuse and guard ring extending through at least some of the dielectric layers.

9. The fuse structure according to claim 1, further comprising a plurality of dielectric layers disposed over the substrate, the interconnects extending through at least some of the dielectric layers.

10. The fuse structure according to claim 1, wherein the fuse line and interconnects form a substantially funnel-shape structure.

11. The fuse structure according to claim 2, wherein the fuse line and interconnects form a substantially funnel-shape structure and the guard ring interconnects form a substantially funnel-shape structure.

12. The fuse structure according to claim 1, further comprising a second plurality of electrically conductive interconnects disposed around the fuse, the second plurality of electrically conductive interconnects formed in the electrically conductive layer in which the fuse is formed and in a predetermined number of the plurality of electrically conductive layers.

13. The fuse structure according to claim 1, further comprising a second plurality of electrically conductive interconnects disposed around the fuse, the second plurality of electrically conductive interconnects formed in an electrically conductive layer above the electrically conductive layer in which the fuse is formed, in the electrically conductive layer in which the fuse is formed and in a predetermined number of the plurality of electrically conductive layers.

14. A method of making a fuse structure for a semiconductor device on a substrate having a circuit area, the method comprising:

forming a pair of electrically conductive, inwardly bent fuse interconnects having first and second ends, in a plurality of electrically conductive layers disposed over the substrate, wherein the first ends of the fuse interconnects are electrically coupled to the circuit area; and

forming an electrically conductive fuse line of a standard fuse length in an electrically conductive layer disposed above the plurality of electrically conductive layers, wherein the fuse line is electrically coupled to the second ends of the fuse interconnects.

15. The method according to claim 14, further comprising the step of forming a second plurality of electrically conductive interconnects around the fuse, the second plurality of electrically conductive interconnects forming a protective guard ring.

16. The method according to claim 15, wherein portions of the interconnects forming end walls of the guard ring are bent inwardly in a manner that follows the fuse interconnects.

17. The method according to claim 14, further comprising the step of forming a fuse window above the fuse line.

18. The method according to claim 16, wherein portions of the interconnects forming side walls of the guard ring are bent inwardly in a manner that follows the fuse interconnects.

19. The method according to claim 15, wherein portions of the interconnects forming side walls of the guard ring are bent inwardly in a manner that follows the fuse interconnects.

20. The fuse structure according to claim 3, wherein portions of the interconnects forming side walls of the guard ring are bent inwardly in a manner that follows the interconnects of the fuse.

21. The fuse structure according to claim 2, wherein portions of the interconnects forming side walls of the guard ring are bent inwardly in a manner that follows the interconnects of the fuse.